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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/799,170	03/12/2004	John F. Kitchin	200312064-1	9512

22879 7590 12/09/2005

HEWLETT PACKARD COMPANY
P O BOX 272400, 3404 E. HARMONY ROAD
INTELLECTUAL PROPERTY ADMINISTRATION
FORT COLLINS, CO 80527-2400

EXAMINER	
ROBBINS, JANET L	

ART UNIT	PAPER NUMBER
2857	

DATE MAILED: 12/09/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/799,170	KITCHIN, JOHN F.	
	Examiner	Art Unit	
	Janet Robbins	2857	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *17 October 2005*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1 and 3-26* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *14 and 15* is/are allowed.

6)☒ Claim(s) *1,3-13,16-24 and 26* is/are rejected.

7)☒ Claim(s) *25* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *17 October 2005* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. The action is responsive to the Amendment filed on 28 October 2005. Claims 1 and 3-26 are pending. Claims 1, 3, 4, 9, 12, 14, 15, 16, and 23 are amended. Claim 2 is cancelled. Claims 25 and 26 are new.

2. The amendments filed 28 October 2005 are sufficient to overcome the prior objection to the abstract, the objections to figures 1, 4A, and 4B, and the objections to claims 14 and 15.

Drawings

1. Figure 3 is too dark making it difficult to distinguish between lines 508 and 506. It is requested that Applicant submit an exploded view of lines 506 and 508. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the

remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claim 26 rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 26 says to forgo the "calculation" however it is not clear whether the calculation it is referring to is the modeling, comparing, or predicting.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 1, 3, 16, 23 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Desplats et al. (US Patent 6,891,363) in view of Breu (US Patent 5,023,916).

With respect to claim 1, Desplats et al. teaches a method of determining distortion in an image of an integrated circuit (col 1, ln 9-12; col 3, ln 24-27; col 7, ln 8-10), comprising:

measuring photon emissions (col 7, ln 23-25, ln 33-35) for a potential photon emission area within the integrated circuit (col 9, ln 6, ln 9-10);

comparing (col 3, ln 64-67; col 9, ln 45-47; col 21, ln 1-7) an expected level of photon emission (col 7, ln 39-41) with the measured photon emissions (col 7, ln 33-35); and

predicting an amount of distortion for the potential photon emission areas based on results of comparing the measured photon emissions to the expected photon emission level (col 3, ln 25-28; col 7, ln 8-10; col 9, ln 34-39; col 22, ln 2-4).

Desplats et al. further teaches defining the potential photon area (col 7, ln 56-59; col 9, ln 6-11; col 18, ln 17-18) but does not teach using a layout database to define the area. Breu teaches using a database for the printed circuit board to find expected locations on a circuit board (col 3, ln 57-69; col 4, ln 3-4). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the teachings of Desplats et al. to include the database of Breu because the database provides a reliable body of information for use for comparison in the designated area to find the best fit between the measured and the expected data (Breu: Col 2, ln 8-28).

With respect to claim 3, Desplats et al. further teaches determining the expected level of photon emissions over the potential photon emission areas (col 3, ln 64-67; col 4, ln 1; col7, ln 39-41; col 9, ln 45-49).

With respect to claims 16 and 23, Desplats et al. teaches a system for determining distortion in an image of an integrated circuit (col 1, ln 9-12; col 3, ln 24-27; col 7, ln 8-10), comprising:

an imaging photomultiplier (Fig. 1, element 102; The IC imaging station is considered to be the functional equivalent of the imaging photomultiplier) coupled to the processing module and configured to measure photon emissions (col 7, ln 23-25, ln 33-35) for the potential photon emission areas (col 9, ln 6, ln 9-10);

wherein the processing module compares the expected level of photon emissions to the measured photon emissions (col 3, ln 25-28; col 7, ln 8-10; col 9, ln 34-39; col 22, ln 2-4);

and produces a mathematical model that predicts an amount of spatial distortion for each potential photon emission area (col 13, ln 55-67).

Desplats et al. does not teach a layout database or a processing module configured to determine the expected level of photon emissions over the potential photon emission areas. Breu teaches a storage module comprising a layout database that determines potential photon emission areas (col 3, ln 57-67); and a processing module (In order to run the programming described, it is considered inherent that there be a processing module; col 2, ln 8-12) coupled to the storage module and configured to determine an expected level of photon emissions over the potential photon emission areas (col 3, ln 57-67). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the teachings of Desplats et al. to include the layout database and processing module of Breu because the database provides a reliable

body of information for use for comparison in the designated area to find the best fit between the measured and the expected data (Breu: col 2, ln 8-28).

With respect to claim 24, Desplats et al. further teaches a predicting means for predicting an amount of spatial distortion for each potential photon area (col 3, ln 25-28; col 7, ln 8-10; col 9, ln 34-39; col 22, ln 2-4).

6. Claims 4, 6, 7, 10, 12,13 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Desplats et al. (US Patent 6,891,363) in view of Breu (US Patent 5,023,916) and further in view of Tsuchiya (US PGPub 2003/0078503 A1).

With respect to claim 4, Desplats et al. and Breu teach the elements of parent claim 1 as shown above, but does not teach implementing a probability density function (PDF). Tsuchiya teaches implementing a PDF to predict the amount of distortion (paragraph 0017, 0018, 0033, 0041). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the teachings of Desplats et al. to include the PDF of Tsuchiya because the calculation permits quick calculation and measurement time (Tsuchiya: paragraph 0024, 0025).

With respect to claim 6, Desplats et al., Breu, and Tsuchiya teach the elements of parent claim 4 as shown above. Tsuchiya further teaches determining a cumulative distribution function (CDF) by convolving the expected level of photon emission with the PDF (paragraph 0034, 0035, 0058). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the teachings Desplats et al. to include the CDF of Tsuchiya because the calculation permits quick calculation and measurement time (Tsuchiya: paragraph 0024, 0025).

With respect to claim 7, Desplats et al., Breu, and Tsuchiya teach the elements of parent claim 4 as shown above. Tsuchiya further teaches approximating the measured photon emissions using the CDF (paragraph 0034, 0035, 0058, 0158). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the teachings Desplats et al. to include the CDF of Tsuchiya because the calculation permits quick calculation and measurement time (Tsuchiya: paragraph 0024, 0025).

With respect to claim 10 and 11, Desplats et al. and Breu teach the elements of parent claim 1 as shown above. Desplats et al. further teaches defining a photon emission area for each phenomena (col 4, ln 7-31). Desplats et al. does not teach modeling this data. Tsuchiya teaches using a model to describe the acquired data (Tsuchiya: paragraph 0036). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the teachings of Desplats et al. to include the modeling of Tsuchiya because the model permits precise and quick calculation of a distribution of photon paths (Tsuchiya: paragraph 0025).

With respect to claim 12, Desplats et al. and Breu teach the elements of parent claim 1 as shown above. Desplats et al. further teaches weighting the amount of distortion by time distortion (col 4, ln 7-31). Desplats et al. does not teach modeling this data. Tsuchiya teaches utilizing a model to describe the acquired data (Tsuchiya: paragraph 0036). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the teachings of Desplats et al. to include the modeling of

Tsuchiya because the model permits precise and quick calculation of a distribution of photon paths (Tsuchiya: paragraph 0025).

With respect to claim 13, Desplats et al., Breu, and Tsuchiya teach the elements of parent claim 12 as shown above. Desplats et al. further teaches the spatial distortion and time distortion are mutually independent (col 20, ln 58-61).

With respect to claim 26, Desplats et al., Breu, and Tsuchiya teach the elements of parent claim 10. Breu further teaches forgoing calculation if the measured photon emissions from the photon emission area are constant (Breu: col 6, ln 13-17). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the teachings of Desplats et al. and Tsuchiya to include the exclusion of data points as done by Breu because this will better indicate where the source of the photon emission while reducing the number of data points to enter into the database (Breu: col 3, ln 57 – col 4, ln 2).

7. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Desplats et al. (US Patent 6,891,363), in view of Breu (US Patent 5,023,916), in view of Tsuchiya (US PGPub 2003/0078503 A1), and further in view of Ishiga (US PGPub 2003/0026477 A1). Desplats et al., Breu, and Tsuchiya teach the elements of parent claim 4 as shown above, but do not teach implementing a Laplace distribution as the PDF. Ishiga teaches using a Laplace distribution as the PDF (Ishiga: paragraph 0073). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the teachings of Desplats et al. and Tsychiya to include the Laplace distribution of Ishiga

because the Laplace distribution has a sharper peak at the mean than the normal distribution making the point of interest more clearly represented.

8. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Desplats et al. (US Patent 6,891,363), in view of Breu (US Patent 5,023,916), and further in view of Barrett et al. (US Patent 6,392,235). Desplats et al. and Breu teach the elements of parent claim 1 as shown above, but do not teach representing the measured photon emissions using vectors of unequal length to reduce mathematical computations. Barrett et al. teaches representing photon emissions with vectors which each have different lengths (Barrett et al.: col 6, ln 53-67). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the teachings of Desplats et al. to include the vectors of Barrett et al. because data processing in this manner will improve spatial resolution and will remain constant over a range of depths (Barrett et al.: col 4, ln 37-43).

9. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Desplats et al. (US Patent 6,891,363), in view of Breu (US Patent 5,023,916), and further in view of Ackermann et al. (US Patent 6,839,656). Desplats et al. and Breu teach the elements of parent claim 1 as shown above, but do not teach predicting the distortion using a NHPP. Ackermann et al. teaches predicting the amount of distortion comprising using a Non-Homogenous Poisson Process (NHPP) (Ackermann et al.: col 1, ln 64-67; col 2, ln 37-42; col 3, ln 24-28; col 6, ln 12-16). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the teachings of Desplats et

al. to include the NHPP of Ackermann et al. because the NHPP predicts the amount of error without using memory for each time-point (Ackermann et al.: col 2, ln 42-44).

10. Claims 17, 18, 19 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Desplats et al. (US Patent 6,891,363), in view of Breu (US Patent 5,023,916), and further in view of Tsuchiya (US PGPub 2003/0078503 A1).

With respect to claims 17 and 18, Desplats et al. and Breu teach the elements of parent claim 16 as shown above, but do not teach implementing a PDF. Tsuchiya teaches implementing a probability density function (PDF) to predict the amount of spatial distortion (paragraph 0017, 0018, 0033, 0041). The PDF is an exponential-power distribution (Tsuchiya: eqn. 1, paragraph 0017). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the teachings of Desplats et al. and Breu to include the PDF of Tsuchiya because the calculation permits quick calculation and measurement time (Tsuchiya: paragraph 0024, 0025).

With respect to claim 19, Desplats et al., Breu, and Tsuchiya teach the elements of parent claim 18. Tsuchiya further teaches determining a cumulative distribution function (CDF) by convolving the expected level of photon emission with the PDF (paragraph 0034, 0035, 0058). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the teachings Desplats et al. to include the CDF of Tsuchiya because the calculation permits quick calculation and measurement time (Tsuchiya: paragraph 0024, 0025).

With respect to claim 21, Desplats et al., Breu and Tsuchiya teach the elements of parent claim 17 as shown above. Desplats et al. further teaches a photon emission

area designated for each phenomenon in a circuit image, and wherein the photon emission area comprises background photon phenomena (Desplats et al.: col 4, ln 7-31; col 9, ln 6-21; col 18, ln 17-25).

11. Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Desplats et al. (US Patent 6,891,363), in view of Breu (US Patent 5,023,916), and Tsuchiya (US PGPub 2003/0078503 A1), and further in view of Ackermann et al. (US Patent 6,839,656). Desplats et al., Breu and Tsuchiya teach the elements of parent claim 17 as shown above. Desplats et al. further teaches processing composite time-spatial distortion and time distortion (Desplats et al.: col 4, ln 7-11). Tsuchiya teaches using a model to describe the acquired data (Tsuchiya: paragraph 0036). Desplats et al., Breu, and Tsuchiya do not teach utilizing NHPPs. Ackermann et al. teaches predicting the amount of spatial distortion comprising using a Non-Homogenous Poisson Process (NHPP) (Ackermann et al.: col 1, ln 64-67; col 2, ln 37-42; col 3, ln 24-28; col 6, ln 12-16). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the teachings of Desplats et al. to include the NHPP of Ackermann et al. because the NHPP predicts the amount of error (distortion) without using memory for each time-point (Ackermann et al.: col 2, ln 42-44).

12. Claim 22 is rejected under 35 U.S.C. 103(a) as being unpatentable over Desplats et al. (US Patent 6,891,363), in view of Breu (US Patent 5,023,916) and further in view of Barrett et al. (US Patent 6,392,235). Desplats et al. and Breu teach the elements of parent claim 16 as shown above, but do not teach representing the measured photon emissions using vectors of unequal length to reduce mathematical computations.

Barrett et al. teaches representing photon emissions with vectors which each have different lengths (Barrett et al.: col 6, ln 53-67). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the teachings of Desplats et al. to include the vectors of Barrett et al. because data processing in this manner will improve spatial resolution and will remain constant over a range of depths (Barrett et al.: col 4, ln 37-43).

Allowable Subject Matter

13. Claim 25 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

14. Claims 14 and 15 are allowed.

15. The following is an examiner's statement of reasons for allowance:

With respect to claim 14, forming the composite time-spatial distortion by evaluating the claimed equation together with predicting distortion for photon emission areas based on comparing measured with expected photon emissions and forming a composite time-distortion model, in combination with all claimed limitations is not found nor suggested in the prior art.

With respect to claim 15, improving the circuit image by approximating the photon intensity of adjacent spaced devices in combination with all other limitations, including comparing measured with expected photon emissions and predicting an

amount of distortion for the potential photon emission areas based on the results of comparing is not found nor suggested in the prior art.

Response to Arguments

3. Applicant's arguments filed 28 October 2005 have been fully considered but they are not persuasive.

Applicant argues that Desplats is not properly combinable with Breu; however Applicant's arguments are not well taken. Desplats is relied upon for analyzing photon emissions from an integrated circuit. Breu is relied upon for providing a layout database. It is well known in the art that a database can be modified to accommodate the necessary amount of information for any application. Therefore it is the Examiner's position that the photon emission data from an integrated circuit from Desplats can be combined with the layout database of Breu.

Conclusion

4. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any

extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Janet Robbins whose telephone number is 571-272-8584. The examiner can normally be reached on weekdays from 8:00am - 4:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Marc Hoff can be reached on 571-272-2216. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

JLR
6 December 2005

MARC S. HOFF
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800